

REMARKS

In the Final Office Action¹, the Examiner objected to claims 8-11 and 13-17 due to informalities; rejected claims 1-7 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,453,727 to Shibasaki et al. ("Shibasaki '727"); and rejected claims 8-11 and 13-17 under 35 U.S.C. § 103(a) as being unpatentable over Shibasaki '727 in view of U.S. Patent No. 6,590,389 to Shibasaki et al. ("Shibasaki '389").

By this amendment, Applicants propose to amend claims 1 and 8. Support for the amendments to claim 1 may be found in the specification at, for example, page 22, lines 13-15, and page 22, line 27 to page 23, line 5. Support for the amendments to claim 8 may be found in the specification at, for example, page 27, line 11 to page 29, line 16 and Table 1. Claims 1-11 and 13-30 are pending, of which claims 1-11 and 13-17 are under current examination, and claims 18-30 are withdrawn from consideration.

I. Claim Objections

The Examiner objected to claim 8 as informal because the phrase "makes contact with the semiconductor thin films only with said active layer," is allegedly unclear. See Office Action, page 2. Applicants propose to change claim 8 to clarify the recited feature. Accordingly, Applicants respectfully request that the Examiner reconsider claim 8 and withdraw to objection to the claim, as well as claims 9-11 and 13-17 that depend from claim 8.

¹ The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statements is identified herein, Applicants decline to automatically subscribe to any statement of characterization in the Office Action.

II. Rejection Under 35 U.S.C § 102(b)

To anticipate claim 1 under Section 102, the reference must disclose the identical invention in as complete detail as is contained in the claim. (See M.P.E.P. § 2143, *citing* Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).) The rejection of claim 1 under 35 U.S.C § 102(b) fails in this regard.

Applicants traverse the rejection of claim 1 under 35 U.S.C. § 102(b) as being anticipated by Shibasaki '727 because the reference fails to disclose, at least, a compound semiconductor stacked structure having “active layer ... thicker than 35 nm and thinner than 70 nm” **and** “lattice constant differences between said active layer and said first and second compound semiconductor layers are set within a range of 0.2% to 0.9%” (emphasis added).

In the Office Action, the Examiner asserts that Shibasaki '727 discloses “a lattice constant that is within 2 percent of the active sensor layer.” (Office Action, p. 3, citing Shibasaki '727, col. 5:50-55.) In particular, Shibasaki '727 discloses a semiconductor sensor fabricated to have minimal crystal lattice mismatch (col. 2:23-29) and that a compound semiconductor layer having a lattice constant should be the same or close to that of a thin film sensor layer (col. 2:31-3:8). Shibasaki '727, however, does not teach “lattice constant differences ... within a range of 0.2% to 0.9%, as recited in claim 1.

As Applicants noted previously, “when the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with “sufficient specificity to constitute an anticipation under

the statute.” (M.P.E.P. § 2131.03(II)) In this case, the $\pm 5\%$ and $\pm 2\%$ ranges disclosed by Shibasaki '727 (col. 5:50-56) substantially exceed the claimed range of 0.2% to 0.9% and does not disclose a lower range of 0.2%. Accordingly, Shibasaki '727 fails to disclose “a range of 0.2% to 0.9%” with sufficient specificity to anticipate this feature of claim 1. Indeed, Shibasaki '727 fails to provide a single example of including the above-noted range for lattice constant difference.

Moreover, Shibasaki '727 does not teach a compound semiconductor stacked structure having “active layer ... thicker than 35 nm and thinner than 70 nm” **and** “lattice constant differences between said active layer and said first and second compound semiconductor layers are set within a range of 0.2% to 0.9%” (emphasis added). Applicants advise that the claimed compound stacked semiconductor structure achieves stable electric characteristics because the claimed structure achieves a favorable relationship between the thicknesses of the layers and the lattice constants, regardless of variations in Sb that unavoidably occur in the 1st and 2nd semiconductor layers due to the difficulty of controlling the amount of Sb. (See Specification, p.24:7-17.) Since the amount of Sb cannot be controlled, the claimed structure limits the impact of Sb on electric characteristics. For example, according to the example 1 of the present application (see specification, Table 2), when the thickness of conventional active layer is 50 nm, the composition variations of first and second compound semiconductor layers are set within a range of lattice constant differences 0.10% to 0.99%, the electron mobility variations are in the average range of $\pm 9\%$, and the sheet resistance variations are in the average range of $\pm 31\%$. These variations are comparatively very small. Thus, the present invention solves conventional problems that, if the lattice constants of

the first and second compound semiconductor layers are too large or too small with respect to the lattice constant of the active layer, electric characteristics (e.g., electron mobility) may vary greatly because of the composition variations in Sb in the first and second compound semiconductor layers. (See Specification, p. 23:10-16.)

Since Shibasaki '727 fails to disclose a compound semiconductor stacked structure having "active layer ... thicker than 35 nm and thinner than 75 nm" **and** "lattice constant differences between said active layer and said first and second compound semiconductor layers are set within a range of 0.2% to 0.9%," the disclosed semiconductor cannot achieve the above-identified benefits. Accordingly, claim 1 is allowable because Shibasaki '727 fails to disclose the identical invention in as complete detail as is recited in claim 1.

Claims 3-7 depend from claim 1 and, therefore, include all the limitations of claim 1. Thus, for the same reasons provided above for claim 1, claims 3-7 are also allowable over Shibasaki '727.

III. Rejection Under 35 U.S.C § 103(a)

Applicants traverse the rejection of claims 8-11 and 13-17 under 35 U.S.C. § 103(a) as being unpatentable over Shibasaki '727 in view of Shibasaki '389. (Office Action, p. 8.) A *prima facie* case of obviousness has not been established. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See M.P.E.P. § 2142, 8th Ed., Rev. 5 (August 2006). Moreover, "in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the

prior art elements in the manner claimed.” USPTO Memorandum from Margaret A. Focarino, Deputy Commissioner for Patent Operations, May 3, 2007, page 2.

Claim 8 is allowable because neither Shibasaki '727 nor Shibasaki '389 discloses or suggests “a passivation covered directly a top surface and side surfaces of said semiconductor thin films other than a part on said active layer” and “a metal electrode layer formed on said passivation and the part on said active layer, electrically isolated from said first and second compound semiconductor layers by said passivation, and makes contact with the active layer of said semiconductor thin films.”

The Examiner concedes that Shibasaki '727 fails to disclose or suggest the claimed “metal electrode.” (Office Action, p. 6) However, the Examiner asserts that the deficiencies of Shibasaki '727 are cured by Shibasaki '389. This is not correct.

Although Shibasaki '389 may disclose a passivation layer 3, the reference is silent with regard to “a metal electrode layer formed on said passivation and the part on said active layer” (emphasis added). In addition, the reference fails to teach or suggest “a metal electrode layer ... electrically isolated from said first and second compound semiconductor layers by said passivation, and makes contact with the active layer of said semiconductor thin films,” as recited in claim 8. Because neither Shibasaki '727 nor Shibasaki '389 teaches or suggests the above-identified missing limitations of claim 8, the claim is allowable over the Examiner’s proposed combination of references. Further, dependent claims 9-11 and 13-17 are also allowable at least due to their respective dependence from allowable independent claim 8. Applicants, therefore, respectfully request that the Examiner allow claim 8, as well as claims 9-11 and 13-17 which are also allowable at least due to their dependence from allowable claim 8.

CONCLUSION

In view of the foregoing remarks, Applicants submit that this claimed invention, as amended, is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicants therefore request the entry of this Amendment, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

Applicants respectfully request that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner, placing claims 1-11 and 13-17 in condition for allowance. Applicants submit that the proposed amendments of claims 1 and 8 do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner, since all of the elements and their relationships claimed were either earlier claimed or inherent in the claims as examined. Therefore, this amendment should allow for immediate action by the Examiner.

Furthermore, Applicants respectfully point out that the final action by the Examiner presented some new arguments as to the application of the art against Applicants' invention. It is respectfully submitted that the entering of the Amendment would allow the Applicants to reply to the final rejections and place the application in condition for allowance.

Finally, Applicants submit that the entry of the amendment would place the application in better form for appeal, should the Examiner dispute the patentability of the pending claims.

Please grant any extensions of time required to enter this response and charge
any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: May 23, 2007

By: *Robert M. Romary* #27432
John M. Romary
Reg. No. 26,331

for